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| APPLICATION NO. | FILING DATE | FIRST NAMED INVENTOR | ATTORNEY DOCKET NO. | CONFIRMATION NO. |
|---|-------------|----------------------|---------------------|------------------|
| 09/895,319 | 07/02/2001 | Toshiaki Shinohara | 210314US2 | 6650 |
| 22850 | 7590 | 03/09/2004 | EXAMINER | |
| OBLON, SPIVAK, MCCLELLAND, MAIER & NEUSTADT, P.C. 1940 DUKE STREET ALEXANDRIA, VA 22314 | | | NGUYEN, DILINH P | |
| | | | ART UNIT | PAPER NUMBER |
| | | | 2814 | |

DATE MAILED: 03/09/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

09/895,319

Applicant(s)

SHINOHARA, TOSHIAKI

Examiner

DiLinh Nguyen

Art Unit

2814

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 24 September 2003.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-8 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-3, 5 and 7 is/are rejected.
- 7) ☒ Claim(s) 4, 6 and 8 is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some * c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date _____.
- 4) ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____.
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: _____.

DETAILED ACTION

Drawings

Figures 8-10 should be designated by a legend such as --Prior Art-- because only that which is old is illustrated. See MPEP § 608.02(g). A proposed drawing correction or corrected drawings are required in reply to the Office action to avoid abandonment of the application. The objection to the drawings will not be held in abeyance.

Claim Rejections - 35 USC § 103

1. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

2. Claims 1-2, 5 and 7 are rejected under 35 U.S.C. 103(a) as being unpatentable over Majumdar et al. (U.S. Pat. 5703399) in view of Wensel (U.S. Pat. 5959349).

Majumdar et al. disclose a semiconductor device (fig. 13) comprising:

a semiconductor element 4a;

a lead frame 3 having a first surface on which the semiconductor element is mounted, and a second surface opposite to the first surface;

a metal block 1 on the second surface of the lead frame;

a bonding material 2 bonding between the second surface of the lead frame and the metal block; wherein the bonding material 2 has a high heat conduction (column 8, line 18).

Majumdar et al. fail to disclose an insulation layer on the metal block opposite the lead frame.

Wensel discloses a semiconductor device (cover fig.) comprising:

a semiconductor element 214;

a metal block 216 on a second surface of a lead frame 220;

an insulation layer 228 (column 5, lines 60 et seq.) on the metal block opposite the lead frame. Therefore, it would have been obvious to one having ordinary skill in the art at the time the invention was made to modify the device of Majumdar et al. to prevent damage to the mold and heat sink, as shown by Wensel.

- Regarding claim 2, Majumdar et al. and Wensel disclose the metal block is disposed in opposed relation to the semiconductor element.
- Regarding claim 5, Wensel discloses a resin package 224 configured to seal the semiconductor element, the lead frame and the metal block while uncovering the insulating layer 228, wherein the insulating layer has a higher heat conduction than the resin package.
- Regarding claim 7, Majumdar et al. disclose the metal block has a first surface and a second surface; wherein the first surface of the metal block is closer, as viewed in a vertical direction, to the lead frame than is the second surface of the metal block, and wherein the bonding material 2 lies between the second surface of the lead frame 3 and the first surface of the metal block 1.

3. Claim 3 is rejected under 35 U.S.C. 103(a) as being unpatentable over Majumdar et al. (U.S. Pat. 5703399) in view of Wensel (U.S. Pat. 5959349) and further in view of Tanaka et al. (U.S. Pat. 5293301).

Majumdar et al. and Wensel fail to disclose the metal block has a wider surface opposite the bonding material than the bonding material.

Tanaka et al. disclose a semiconductor device (cover fig.) comprising a metal block 25 has a wider surface opposite a bonding material 32 than the bonding material. Therefore, it would have been obvious to one having ordinary skill in the art at the time the invention was made to modify the device of Majumdar et al. and Wensel to ensure a sufficient radiation surface, as shown by Tanaka et al.

Allowable Subject Matter

Claims 4, 6 and 8 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

Conclusion

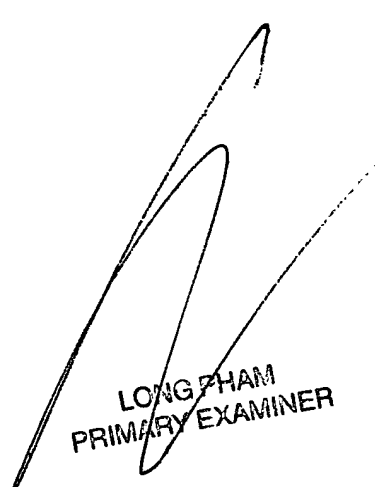
Any inquiry concerning this communication or earlier communications from the examiner should be directed to DiLinh Nguyen whose telephone number is (571) 272-1712. The examiner can normally be reached on 8:00AM - 6:00PM (M-F).

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Wael Fahmy can be reached on (571) 272-1705. The fax phone numbers for the organization where this application or proceeding is assigned are (703) 872-9306 for regular communications and (703) 872-9306 for After Final communications.

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Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is (703) 308-0956.

DLN
February 27, 2004



LONG PHAM
PRIMARY EXAMINER